REMARKS

This paper is being provided in response to the May 28, 2002 Office Action for the above-referenced application. In this response, applicant has cancelled claims 1-9, 15, 21 and 27, and amended claims 10-14,16-20 and 22-26 in order to clarify that which applicant has claimed in accordance with the suggestions in the Office Action. Applicant respectfully submits that the modifications to the claims are all supported by the originally filed specification.

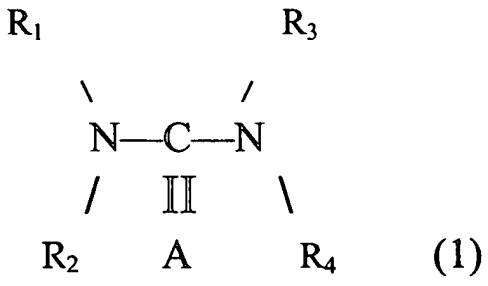
The rejection of claims 9-26 under 35 U.S.C. §112, second paragraph, has been addressed by the claims amendment contained herein. Accordingly, applicant respectfully requests that this rejection, as set forth in the Office Action, be withdrawn.

The rejection of claims 9-14 under 35 U.S.C. §102(e) as being anticipated by Small (U.S. Patent No. 5,981,454, hereinafter referred to as "Small") is hereby traversed and reconsideration thereof is respectfully requested. Claim 9 has been cancelled. Applicants respectfully submit that claims 10-14, as amended herein, are patentably distinct over the cited reference.

Independent claim 10, as amended herein, recites a stripping method which includes stripping a resist film or an etching residue on a semiconductor wafer having an exposed metal film, by using a stripper composition containing an anticorrosive agent which contains (a) urea or a urea derivative, (b) a hydroxy aromatic compound, (c) a hydroxylamine or an alkanolamine, (d) water and (e) a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones as essential components.

Independent claim 11, as amended herein, recites a stripping method which includes stripping a resist film or an etching residue on a semiconductor wafer having an exposed metal film, using a stripper composition containing an anticorrosive agent which contains (a) urea or a urea derivative, (b) a hydroxy aromatic compound, (c) a hydroxylamine or an alkanolamine, (d) water and (e) a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones as essential components, wherein the amounts of the components (a), (b), (c) and (d) are 1 to 60% by mass, 0.1 to 20% by mass, 5 to 70% by mass and 2 to 40% by mass, respectively.

Independent claim 12, as amended herein, recites a stripping method which includes stripping a resist film and/or an etching residue on a semiconductor wafer having an exposed metal film, using a stripper composition containing an anticorrosive agent which contains (a) urea or a urea derivative, (b) a hydroxy aromatic compound, and a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones, as essential components, wherein the component (a) is a compound represented by the following general formula (1):



with R_1, R_2, R_3 and R_4 each independently a hydrogen atom or an alkyl group having 1 to 3 carbon atoms; and A is an oxygen atom or a sulfur atom.

Independent claim 13, as amended herein, recites a stripping method which includes stripping a resist film and/or an etching residue on a semiconductor wafer having an exposed metal film, by using a stripper composition containing an anticorrosive agent which contains (a) urea or a urea derivative, (b) a hydroxy aromatic compound, having a benzene derivative having at least two phenolic hydroxyl groups in the molecule, and a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones as essential components.

Independent claim 14, as amended herein, recites a stripping method which includes stripping a resist film and/or an etching residue on a semiconductor wafer having an exposed metal film, by using a stripper composition containing an anticorrosive agent which contains (a) urea or a urea derivative, (b) a hydroxy aromatic compound, and a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones, as essential components, wherein the component (b) is a benzene derivative having at least two phenolic hydroxyl groups in the molecule having at least one compound selected from the group consisting of pyrogallol, hydroxyhydroquinone, fluoroglucinol, gallic acid and tannic acid.

The cited art of Small discloses a method for removing chemical residue from metal layers. The residues removed are either particulates or post etch residue such as chemicals that may cause corrosion if not removed. The solution used is aqueous with an acidic nature with various salts, acids and amines added to make the solution into an oxidizing material.

Applicant respectfully submits that the cited reference does not contain at least the recited feature of "... *a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones as essential components* ...", as set forth in applicant's independent claims 10-14, as amended herein. The cited reference does not disclose at least this feature of the claimed invention, but rather discloses an acidic/oxidizing solution. Therefore, since the cited reference does not contain each and every feature of the claimed invention, the cited reference can not anticipate independent claims 10-14.

Therefore, since the cited reference does not contain each and every feature of the claimed invention, the cited reference can not anticipate independent claims 10-14. For at least the above noted reasons, applicant respectfully requests that this rejection, as set forth in the Office Action, be withdrawn.

The rejection of claims 15-29 under 35 U.S.C. §103(a) as being unpatentable over Small in view of Zhao (U.S. Patent No. 6,204,192, hereinafter referred to as "Zhao"), is hereby traversed and reconsideration thereof is respectfully requested. Claims 15, 21 and 27 have been cancelled. Applicants respectfully submit that claims 16-20 and 22-26, as

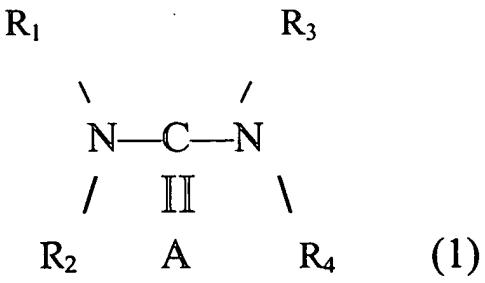
amended herein, are patentably distinct over the cited references, whether taken alone or in any combination.

Independent claim 16, as amended herein, recites a stripping method which includes forming, on a semiconductor wafer, a metal film and an insulating film in this order, forming a resist film on the wafer, conducting dry etching with the resist film used as a mask, to form, in the insulating film, dents reaching the metal film, then stripping the resist film or the residue of etching by using a stripper composition containing an anticorrosive agent which contains (a) urea or a urea derivative, (b) a hydroxy aromatic compound, (c) a hydroxylamine or an alkanolamine, (d) water, and (e) a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones, as essential components.

Independent claim 17, as amended herein, recites a stripping method which includes forming, on a semiconductor wafer, a metal film and an insulating film in this order, forming a resist film on the wafer, conducting dry etching with the resist film being used as a mask, to form, in the insulating film, dents reaching the metal film, then stripping the resist film or the residue of etching by using a stripper composition containing an anticorrosive agent which contains (a) urea or a urea derivative, (b) a hydroxy aromatic compound, (c) a hydroxylamine or an alkanolamine, (d) water, and (e) a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones, as essential components, wherein the amounts of the components (a),

(b), (c) and (d) are 1 to 60% by mass, 0.1 to 20% by mass, 5 to 70% by mass and 2 to 40% by mass, respectively.

Independent claim 18, as amended herein, recites a stripping method which includes forming, on a semiconductor wafer, a metal film and an insulating film in this order, forming a resist film thereon, conducting dry etching with the resist film being used as a mask, to form, in the insulating film, dents reaching the metal film; then stripping the resist film or the residue of etching by using a stripper composition containing an anticorrosive agent which contains (a) urea or a urea derivative, (b) a hydroxy aromatic compound, and a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones as essential components, wherein the component (a) is a compound represented by the following general formula (1):



(1)

where R_1, R_2, R_3 and R_4 are each independently a hydrogen atom or an alkyl group having 1 to 3 carbon atoms; and A is an oxygen atom or a sulfur atom.

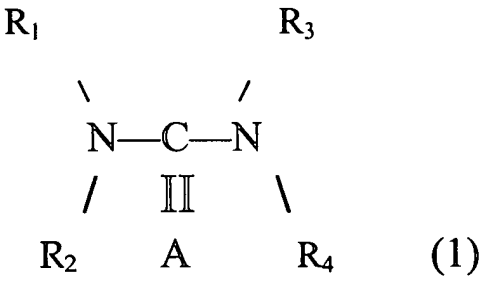
Independent claim 19, as amended herein, recites a stripping method which includes forming, on a semiconductor wafer, a metal film and an insulating film in this order, forming a resist film on the wafer and conducting dry etching with the resist film being used as a mask, to form, in the insulating film, dents reaching the metal film, then stripping the resist film or the residue of etching by using a stripper composition containing an anticorrosive agent which contains (a) urea or a urea derivative and (b) a hydroxy aromatic compound, having a benzene derivative having at least two phenolic hydroxyl groups in the molecule, and a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones, as essential components.

Independent claim 20, as amended herein, recites a stripping method which includes forming, on a semiconductor wafer, a metal film and an insulating film in this order, forming a resist film on the wafer, conducting dry etching with the resist film being used as a mask, to form, in the insulating film, dents reaching the metal film, then stripping the resist film and/or the residue of etching by using a stripper composition containing an anticorrosive agent which contains (a) urea or a urea derivative, (b) a hydroxy aromatic compound, and a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones, as essential components, where the component (b) is a benzene derivative having at least two phenolic hydroxyl groups in the molecule having at least one compound selected from the group consisting of pyrogallol, hydroxyhydroquinone, fluoroglucinol, gallic acid and tannic acid.

Independent claim 22, as amended herein, recites a stripping method which includes forming, on a semiconductor wafer, a metal film, a first insulating film and a second insulating film having desired openings, conducting dry etching with the second insulating film being used as a mask, to form, in the first insulating film, dents reaching the metal film, then stripping the residue of etching by using a stripper composition containing an anticorrosive agent which contains (a) urea or a urea derivative, (b) a hydroxy aromatic compound, (c) a hydroxylamine or an alkanolamine, (d) water and (e) a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones as essential components.

Independent claim 23, as amended herein, recites a stripping method which includes forming, on a semiconductor wafer, a metal film, a first insulating film and a second insulating film having desired openings, conducting dry etching with the second insulating film being used as a mask, to form, in the first insulating film, dents reaching the metal film, then stripping the residue of etching by using a stripper composition containing an anticorrosive agent which contains (a) urea or a urea derivative, (b) a hydroxy aromatic compound, (c) a hydroxylamine or an alkanolamine, (d) water and (e) a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones as essential components, wherein the amounts of the components (a), (b), (c) and (d) are 1 to 60% by mass, 0.1 to 20% by mass, 5 to 70% by mass and 2 to 40% by mass, respectively.

Independent claim 24, as amended herein, recites a stripping method which includes forming, on a semiconductor wafer, a metal film, a first insulating film and a second insulating film having desired openings, conducting dry etching with the second insulating film being used as a mask, to form, in the first insulating film, dents reaching the metal film; then stripping the residue of etching by using a stripper composition containing an anticorrosive agent which contains (a) urea or a urea derivative, (b) a hydroxy aromatic compound, and a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones, as essential components, where the component (a) is a compound represented by the following general formula (1):



(1)

where R_1, R_2, R_3 and R_4 are each independently a hydrogen atom or an alkyl group having 1 to 3 carbon atoms; and A is an oxygen atom or a sulfur atom.

Independent claim 25, as amended herein, recites a stripping method which includes forming, on a semiconductor wafer, a metal film, a first insulating film and a second insulating film having desired openings, conducting dry etching with the second insulating film being used as a mask, to form, in the first insulating film, dents reaching

the metal film, then stripping the residue of etching by using a stripper composition containing an anticorrosive agent which contains (a) urea or a urea derivative and (b) a hydroxy aromatic compound, having a benzene derivative having at least two phenolic hydroxyl groups in the molecule, and a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones, as essential components.

Independent claim 26, as amended herein, recites a stripping method which includes forming, on a semiconductor wafer, a metal film, a first insulating film and a second insulating film having desired openings, conducting dry etching with the second insulating film being used as a mask, to form, in the first insulating film, dents reaching the metal film, then stripping the residue of etching by using a stripper composition containing an anticorrosive agent which contains (a) urea or a urea derivative, (b) a hydroxy aromatic compound, and a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones as essential components, where the component (b) is a benzene derivative having at least two phenolic hydroxyl groups in the molecule having at least one compound selected from the group consisting of pyrogallol, hydroxyhydroquinone, fluoroglucinol, gallic acid and tannic acid. Claims 28 and 29 depend from independent claims 10 and 11 respectively, and recite the additional features of the metal film being copper.

The cited art of Small is discussed above. The cited art of Zhao discloses a method of removing etch residues by means of a hydrogen plasma. The Office Action uses the Zhao reference to show that it is known in the art to have metal and dielectric films that are etched, and that the etching of metal layers using an overlaying dielectric layer are known.

Applicant respectfully submits that the cited Zhao reference does nothing to improve the above noted missing feature in Small even if the suggested combination of cited references were to be allowable. Applicant respectfully submits that at least the combination of claimed features of "... *a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones as essential components* ...", as recited in claims 16, and similar wording in the other independent claims, still would not be present in the cited prior art, whether taken alone or in any combination. This is true for many of the same reasons given above with reference to the prior rejection.

For at least the above noted reasons, applicant respectfully requests that this rejection, as set forth in the Office Action, be withdrawn.

The rejection of claims 9-14 under 35 U.S.C. §103(a) as being unpatentable over Morinaga (U.S. Patent No. 5,885,362, hereinafter referred to as "Morinaga") is hereby traversed and reconsideration thereof is respectfully requested. Claim 9 has been cancelled. Applicants respectfully submit that claims 10-14, as amended herein, are

patentably distinct over the cited reference, whether taken alone or in any combination with known prior art.

The features of the claims, as amended herein, are discussed above.

The cited art of Morinaga discloses a method for cleaning metal and glass surfaces using various hydroxys, urea and water. The cited reference discloses materials to remove etching residues and contamination such as particles, and does not suggest stripping resists or other organic layers with exposed metal.

Applicant respectfully submits that at least the combination of claimed features of'... *a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones as essential components* ...", as recited in the present claims, is not present in the cited prior art, whether taken alone or in combination with any well know art. This is true because, as with Small, Moriniga does not show, teach, or suggest the recited features of a water soluble organic solvent.

For at least the above noted reasons, applicant respectfully requests that this rejection, as set forth in the Office Action, be withdrawn.

The rejection of claims 15-29 under 35 U.S.C. §103(a) as being unpatentable over Morinaga and Zhao, is hereby traversed and reconsideration thereof is respectfully

requested. Claims 15, 21 and 27 have been cancelled. Applicants respectfully submit that the remaining claims, as amended herein, are patentably distinct over the cited references, whether taken alone or in any combination.

The features of the claims, as amended herein, have been discussed above.

The cited art of Morinaga and Zhao have been discussed above.

Applicant respectfully submits that even if the suggested combination of cited references were to be allowable, at least the combination of claimed features of"... *a water soluble organic solvent selected from the group including sulfoxides, dimethylformamides, dimethyl acetamides, glycols, glycol ethers, pyrrolidones, imidazolidinones as essential components* ...", as recited in the present claims, still would not be present in the cited prior art, whether taken alone or in any combination. This is true for many of the same reasons given above with reference to the prior rejections.

For at least the above noted reasons, applicant respectfully requests that this rejection, as set forth in the Office Action, be withdrawn.

Furthermore, in connection with the above rejections and prior art cited therein, Applicants respectfully submit that the cited prior art references neither disclose, teach, or suggest the specific ureas and hydroxylaromatics, distinct compounds recited in Applicants' claimed invention. The ureas and hydroxylaromatics are used both together

as an anticorrosive and, without both of them, Applicants' claimed invention is rendered ineffective. Without the hydroxylaromatics, oxidation prevention by an N atom coordination of the ureas is not sufficient, and oxidation prevention by the hydroxylaromatics alone is just at the same level as oxygen block because the hydroxylaromatics have no N atom.

Additionally, the ureas are also effective at the point of solubility to organic solvents as well as biodegradability. In contrast, the N-containing ring compounds in the cited prior art references have low biodegradability and do not teach the use of urea and its derivative for this purpose and providing the advantage of increased biodegradability, as in Applicants' claimed invention. Although the hydroxylaromatics, such as catechols, are disclosed in the prior art, the catechols are used as monoethanolamine in the conventional release agents.

Based on the above, applicant respectfully requests that the Examiner reconsider and withdraw all outstanding rejections and objections. Favorable consideration and allowance are earnestly solicited. Should there be any questions after reviewing this paper, the Examiner is invited to contact the undersigned at 617-951-6676.

Respectfully submitted,
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